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ABSTRACT

Although British psychologist Francis Galton lost the battle for the definition of intelligence in his own time, his views live on in the work of Richard Herrnstein and Charles Murray. They argue that the Intelligence Quotient (IQ) is an adequate measure of intelligence, and that IQ is highly heritable. They contend that there are racial and ethnic group differences in intelligence, and that these matter for society. They further believe that tests have been and should be a gating mechanism because they tell who will be better and who will be worse in a variety of pursuits. Their ideas, however, deserve more scrutiny than influence. Herrnstein and Murray ignore the large body of research that says IQ is not the be-all and end-all that they make it out to be. They imply that psychologists are in fundamental agreement on what intelligence really is, but, in fact, psychologists continue to debate the nature of intelligence. There are racial differences in IQ, but are these really differences in intelligence? Herrnstein and Murray vastly underestimate the socialization effects of schooling, home, and community. Even if intelligence does have a degree of heritability, as it most likely does, this does not mean that it cannot be increased. It is regrettable that the main message of "The Bell Curve" is so intellectually corrupt, because there are points in the book that are worthy of discussion. These include society's undervaluing of the intellectually gifted, the degrading of textbooks as opposed to the raising of standards, and the failure of affirmative action to accomplish all it promised. (SLD)

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EdPress presents

Robert J. Sternberg
Yale University
1995 Elam Lecturer

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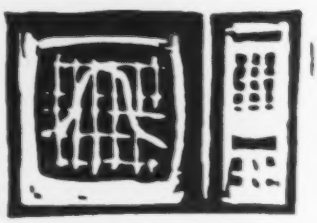

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For Whom Does The Bell Curve *Toll? It Tolls for You.*

Nearly every time you invite an Ivy league academic windbag to give a talk, you run the risk of getting what ex-Vice President Spiro Agnew called an "effete intellectual snob" who just yesterday was speaking in the "Windy City." The day before, he had spoken in Paris. What with jet lag, long plane delays, and no sleep, the windbag realizes that he has become incoherent. So incoherent that he realizes that, as he is taking the cab from the airport to the Sheraton, that he has offered the cabdriver one half of his honorarium to give his talk. But the windbag tells the cabdriver not to worry—it's all written out. All he has to do is read it. Anyway, the windbag promises to be in the back of the room—just in case there's trouble. The cabdriver accepts. He presents the talk flawlessly. But then someone asks a really simple question. The cabdriver can't answer it, because it's not his talk. The cabdriver puzzles for a moment, and then says, "Hey! That question's so easy even my cabdriver can answer it!"

Now, the point of this little story is that the professor is supposed to be intelligent—that is, after all, how he got the job. And yet it seems like the cabdriver is pretty smart, too. That was a pretty clever move to turn things around like that. Although I think we should celebrate the intelligence of the professor, of course, the intelligence the taxi driver displays in getting out of a difficult situation is important, too.

In my talk today I want to present some views on intelligence, teaching, assessment—and I'm going to contrast them with the views presented by Richard Herrnstein and Charles Murray, the authors of *The Bell Curve*. But first, a little background.

If I asked you to recall the main events of 1904, you would probably draw a blank. Just another insignificant year. But the authors of *The Bell Curve* almost certainly would not draw a blank, because without that

year, they would have been out a book. Two crucial events happened that year that shaped the thinking behind this book.

First, Alfred Binet was asked by the Minister of Instruction in Paris to devise a test that would distinguish children who were genuinely mentally retarded from those who were merely behavioral problems. Working with Theodosius Simon, Binet prepared such a test, which lives on today—translated and many times revised—as the Stanford Binet intelligence scales. A Stanford psychologist, Lewis Terman, brought the scales to the United States years ago and the school's name was added.

Second, that same year, Charles Spearman published his first article arguing for the importance of what he referred to as *g*, or general ability. His idea introduced the notion that a single number can somehow capture all that really matters about human abilities.

In a sense, the contributions of Binet and Spearman were each innocuous in their own right. Together, the contributions had the potential to serve as a binary explosive, that is, one in which each ingredient is harmless in itself, but the two ingredients of which are explosive and lethal in combination. Binet provided a test, but no rigorous scientific theory of what the test was measuring. Rather, he constructed test items in a wholly empirical fashion, retaining those items that distinguished the performance of older children from that of younger children. Spearman provided the scientific theory, but no durable testing instruments. His theory was that underlying the test scores was *g*, general ability, which he equated with mental energy. All that was needed for an explosion was to combine the materials and light the fuse.

The fuse was lit when, early in the century, psychologists such as Carl Brigham, Henry Goddard, and others, argued that the tests could be used not only to distinguish among individuals, but among racial, ethnic and other groups. The lower test scores of some groups, according to these psychologists, indicated the intellectual inferiority of these groups. So immigrants to the United States would arrive on our shores, and the first thing they would see was the Statue of Liberty. The second was a test of intelligence—for which they were totally unprepared. The test could be and was used much as the test for HIV is used today—to screen out those who were seen as undesirable. Stephen Gould, among others, has written of the excesses that resulted. The view of such differences between ethnic groups and races lives on in

the *Bell Curve* book. Spearman, a believer in racial differences in intelligence, might have applauded the Herrnstein/Murray book. But Binet almost certainly would not have.

Three ironies should be noted with regard to Binet's work, especially in light of the arguments of Herrnstein and Murray.

First, the goal of the test was to *protect* children from callous labeling. At the time, the distinction between mental retardation and behavioral problems was not clear. The goal of Paris' Minister of Instruction, and of Binet, was to ensure that children whom a teacher found merely disagreeable were not, as a result of their intransigence, relegated to classes for the retarded where the teacher would not have to deal with them anymore. Perhaps little has changed: Ethnic and other groups not conforming to conventional behavioral patterns of society are still labeled "mentally inferior."

Second, Binet ardently believed in the feasibility of raising intelligence, and devised "mental orthopedics" just for this end. He is less known for these efforts to raise intelligence, *perhaps because the goal of raising intelligence has never been quite so much in fashion as the goal of measuring it.*

Third, Binet's efforts were in opposition to earlier efforts by British psychologist Francis Galton, cousin of Charles Darwin, to promote an alternative view of intelligence. This view emphasized performances on very simple psychophysical tasks involving strength, agility, and simple reaction time as the bases of intelligence. Had Galton won out in the battle for the "definition" of intelligence, and if one were to accept the data presented by Herrnstein and Murray, these authors, or more likely, their African and African American counterparts, might have written a book today arguing that blacks are superior in intelligence to whites. Although Galton, fortunately, lost the battle for the definition of intelligence, he won a consolation prize: his views on the high heritability of intelligence live on today in the work of Herrnstein, Murray, and many others. And, despite the age of these beliefs, they are still wrong.

Let's take a closer look at the current state of these arguments. Herrnstein and Murray's are simple:

- Intelligence is extremely important to many facets of life.
- IQ is an adequate measure of intelligence.
- IQ is highly heritable, and hence is passed on through the genes from one generation to the next.
- There are racial and ethnic

group differences in intelligence, and these matter for society. Indeed, many of the problems our society faces today are due to the differences in IQ among its members. If we don't get real about these differences, we're in for even bigger trouble than we have already.

- Tests have been and should be used as a gating mechanism, because they tell us most of what we need to know about who will be better and who worse in a variety of pursuits.

Self-Fulfilling Prophecies

The United States' enthusiastic use of tests as a gating mechanism has created an interesting phenomenon: we create a cultural artifact, forget we have created it, and then later try to claim it to be a natural phenomenon.

Consider the case of "Barbara," a student who applied to the graduate program at Yale and who was rejected despite stellar letters of recommendation and an outstanding record of research ideas and experience—supposedly the two things that counted most in the graduate admissions process. When all was said and done, she was rejected because of low scores on the Graduate Record Examination, the intelligence-type test used by most graduate schools for admission. My concern in Barbara's case was that she was representative of a class of people who would get rejected not only by Yale but by all other competitive colleges as well, because these institutions all use the same test.

Of course, there were other career options open to Barbara if she didn't want to slug it out with the GRE. But all of those career options involved roughly the same slug-fest. If Barbara wanted to go to law school, she would have to take a test that for practical purposes is essentially identical, the LSAT; if she wanted to go to medical school, the MCAT awaited her; of course, she could go to business school, if only she were willing to take the GMAT. Well, you get the idea. Virtually all of the professions held in such high regard by Herrnstein, Murray, and others require tests as a gating mechanism. Is it any surprise, then, that doctors, lawyers, professors, and business executives test so well, when their opportunities to enter these occupations are controlled by the very same tests on which they score well? If they hadn't scored well, they would have been locked out of these careers.

This is no abstract academic argument. As a child, I did poorly on standardized tests because of test anxiety, to the point where in sixth grade I was sent back to a fifth-grade classroom to take an intelligence test, one suitable for

my level of abilities. In the early years of school, my teachers, aware of my low ability, had low expectations, and I did whatever I could to please them and meet these low expectations. Had I not had one teacher who believed in me and expected more, I might still be trying to meet low expectations today. Many individuals, especially members of disfavored groups, never get that one teacher or other role model, and lose out in the sweepstakes not only in childhood and adolescence, but for the rest of their lives.

By the way, I hired Barbara as a research associate, she did excellent work, and was later admitted to the graduate program. But for every individual who gets the chance to show what she can do despite bombing out on tests, there are doubtless hundreds or even thousands who are consigned to the dust heaps of academic history because of low test scores. These people, deprived of opportunities, are later criticized for not availing themselves of opportunities that were never made available to them, and for pursuing only undesirable occupations, which were all that were left for them! Nothing new here: Jews used to be criticized for being moneylenders, at a time when this occupation was one of the few that they were allowed to pursue.

A Question of Values

Why are the Barbaras of the world—white, black, green, purple—devalued so pointedly in our society? Why, in contrast, are the ceiling-busters on the ability tests so highly valued? And when we speak of the Herrnstein/Murray book, we are not talking only of intellectual valuing. These authors link the lack of personal, economic, occupational, health-related, social, and other kinds of success that they believe go along with low IQ; they seem also to link IQ with desirable behavior along almost any dimension at all (that they were able to think of).

There are several reasons for the devaluing, none of which are really acknowledged in the book. These hidden reasons will give this book influence far beyond what it perhaps deserves. It deserves more scrutiny than influence.

First, we are fascinated with quantitative precision. As a society, we like quantitative data. Herrnstein and Murray do also; in fact, they build their whole argument on the edifice of their (often wrong) interpretations of statistics. A teacher may value a child with an IQ of 94 and an SAT score of 330. But where does society place its trust? In the testimony of a perhaps emotional teacher or in the quantitative precision of a standardized test

created in Princeton? I will show, however, that we run into problems not so much with statistics as with our interpretations of them.

The second hidden reason is that those in positions of power and authority to make important decisions are themselves persons who did well enough on tests to get where they are. Humans tend to value other humans who are like themselves, whether with respect to ethnic group, class level, or test scores. Groups have always tended to favor their own, in the U.S. and elsewhere. Once high test scorers have reached positions of influence, they will look for, and look out for, others like themselves. They will value the holders of the scores that got the fortunate ones to where they are.

Third is the fact that, as a nation, we have become obsessed with test scores. These scores not only determine who gets society's rewards, but even help set property values in one community versus another. Who wants to pay a premium for a house in a community where the test scores are low? Many of us seek housing where the scores are high, in hopes that our own children will have the greater educational benefits associated with such areas. We may worship God in church, but outside it seems we worship test scores.

Fourth, I believe, is plain superstition. Have you ever seen someone walk up to a lit elevator button and press the button, sometimes again and again, in the hope that the elevator will come that much sooner? Why do people do such a silly thing? Because when they keep pressing the button, the elevator always gets there eventually. They are always—always—rewarded for pushing the button. So, as with the rat in the maze, the reinforced behavior is strengthened, be it sensible or not. In our society, high test scores lead to so many rewards that we begin to lose any healthy suspicion we might have had of them. We become mindless elevator-button pushers, certain that what we believe must be true. Moreover, as we see in the Herrnstein/Murray arguments, we are later ready to describe as a natural phenomenon the very circumstances we, as a society, have created: We cause social stratification by IQ, and then marvel at how it has happened.

The Cultural/Societal Landscape

As a society, we have created, or at least allowed to emerge, an environmental landscape in which the poor grow up in substandard housing, often accompanied by substandard nutrition and horrific rates of drug use and crime. To survive in these condi-

tions requires many skills, but IQ is probably not among the most important of them. Try spending a few days and nights in your local urban ghetto, or try spending a year there, and see whether you even live thereafter to tell the tale. People in such environments need to develop adaptive skills, all right, but probably not the ones that IQ tests measure. That's not to say that no one will develop such skills, as Herrnstein and Murray painstakingly point out. But every line graph and every correlation presented in their book is predicated on the cultural/societal landscape as it exists, and the results might have been very different were this landscape different.

The statistic that Herrnstein and Murray so often use, called the heritability coefficient, is not a fixed number. It is a function of time and place. As the authors themselves point out, *heritability can vary as a function of nature and range of both environments and the gene pool.* But all statistics, not just the coefficient of heritability, are predicated on the environmental landscape as it exists, and we cannot know what these statistics would have looked like if we had given to the unfortunate—economically, educationally, or otherwise—opportunities that we have not given them. What we do know is that, for better or worse, people have to adapt to their environments, and the skills that people develop in order best to adapt may well differ.

Herrnstein and Murray ignore this fact, as well as a large body of research suggesting that IQ is not the be-all and end-all that they make it out to be. Some examples of this research follow:

- Steve Ceci has found that the average IQ in a group of men who were highly successful bettors at the race track was a mere 97, slightly below average. They, like the urban survivor, adapted to their own context.
- Jean Lave has shown that housewives who find themselves utterly perplexed when confronted with paper-and-pencil arithmetic problems do just fine when they are required to perform exactly the same computations in the comparison shopping of the supermarket. They, too, adapted to the demands of their real-world environment, which does not involve IQ tests.
- Terezinha Nunes has found that Brazilian street children who may be failing math have no trouble doing the math required in their street businesses and, equally, for their physical survival.
- Howard Gardner has found that people who are intelligent in terms of what he calls musical or interpersonal or bodily-kinesthetic intelligence are often not those who are highest in IQ.

• In our own work, we have found no relation between scores on tests of practical intelligence that we have given to business executives and scores on conventional tests of intelligence. These and many other studies suggest that there is quite a bit more to intelligence than what the intelligence tests measure, and yet, except for some brief comments at the beginning, Herrnstein and Murray simply ignore most of the research that does not support their position. *Intelligence is the ability purposively to adapt to the environments in which people find themselves, and the kinds of skills measured by conventional intelligence tests are only a part of these abilities.* The further that your environment departs from that of the mainstream society, the more other abilities become important. Indeed, Binet created his test to predict performance in the classroom, so that is all it does.

There is even an irony to all of Herrnstein and Murray's emphasis on IQ. The irony is that high IQ is not always a blessing. For example, some studies have found that although IQ is correlated with success, at the very high end of the scale the relation may become negative. People with stratospheric IQs may attempt to overuse these abilities, resulting in lesser degrees of success, as when a political leader gets so involved in analyzing every aspect of a problem that the problem explodes before he or she gets the chance to do anything about it. Some call this "paralysis by analysis." In a related vein, Fred Fiedler has found that under conditions of low stress, IQ tends to be more crucial to leadership success than is experience, but under conditions of high stress, experience is more important and IQ may actually be detrimental.

It is interesting to consider the case of Marilyn Vos Savant, who claims to have the highest IQ on record, and may well have it for all I know. Vos Savant writes a column in *Parade* magazine that is decent, although perhaps not fully demonstrative of her Einstein-plus IQ. Most people would find the theory of general relativity to show somewhat more intellectual capital. What has led Vos Savant to the success of having a column in a widely-circulated magazine is not the IQ itself, but her practical intelligence—call it shrewdness—in being able to capitalize on the childhood IQ score. The fact is that the success of Herrnstein and Murray, and of their promotions and public-relations staffs, reflects not their IQ points but, again, their Savantian shrewdness in drumming up publicity. Certainly there is more to intelligence than IQ, and for better or worse what distinguishes Vos Savant, on the one hand,

and Herrnstein and Murray on the other is that "something more."

What, Then, is Intelligence?

If, as suggested above, there is more to intelligence than IQ, just what is intelligence? Herrnstein and Murray would have us believe that, except for a few oddballs, psychologists are in fundamental agreement on this question and on the data they present in their book; only the lay public remains sadly uninformed. In fact, nothing could be further from the truth. Psychologists today debate the meaning of intelligence every bit as much as they did in the day of Binet, and almost all the interpretations in the Herrnstein/Murray book have been and will be actively debated among psychologists and other behavioral scientists. It is true, as they say, that psychologists are aware of these arguments. It is not true that the arguments are widely accepted, especially with regard to what intelligence is.

Intelligence is the ability to perform in culturally valued ways and to produce culturally valued products. Note that it is an ability: A person could have the ability, but not utilize it. IQ tests measure performances (e.g., knowing the meanings of words) and products (e.g., pencil lines on an electronically scannable answer sheet) that our culture happens to value. Not every culture equally values the same products, for example, pencil lines on an answer sheet.

Personally, I'm lucky. Our culture values writing, and I'm a decent writer. Not every culture even has analogous written forms of expression, however. Put me in a culture that highly values hunting skills, navigational finesse under the stars, or, for that matter, physical prowess, and I would look stupid pretty fast. On a test of general hunting ability, I will come out poorly, and my performance in a society of hunters will reflect my performance on the test. There have been and continue to be cultures that value these and other things. There is nothing special about IQ over the range of space and time just because we choose to make it special in our current culture.

Even within our own culture, a highly accomplished cellist lacking visualization or spatial ability would probably be awful as an architect, mechanic, civil engineer, or taxi driver. Some of the best scientists I know, who are extremely skilled researchers, can hardly carry on an intelligent conversation that is not about their field of specialization. One could certainly not imagine them as courtroom lawyers, coherently defending clients. We do not need tests to tell us that the abili-

ties that lead to success in various pursuits within our own culture are far more diverse than could be captured by a single number.

We cannot assess intelligence in a vacuum. As the great Russian psychologist, Lev Vygotsky, pointed out, we cannot really know someone's underlying capacity, but only his or her abilities as expressed through some form of measurement. The skills we value in our testing, such as speed of performance (the overwhelming majority of IQ tests are timed), may not be tested or even valued in other cultures. Some cultures might even have the "good sense" to realize that important problems and decisions in life are not made in the few seconds we are allowed to solve individual problems on IQ tests. We are always confounding a person's true level of underlying intelligence with the means we use to assess it.

And what is this true level of underlying intelligence? *I believe that what really matters in the world is not intelligence, per se, but actualized intelligence.* The world is full of people who have the ability to accomplish great things, but who do next to nothing, either because they don't want to accomplish much, or because they are not allowed to do so. Actualized intelligence requires a person to recognize his or her strengths and weaknesses, and moreover, to capitalize on the strengths and to compensate for or improve upon the weaknesses.

Really, no one is good at everything. If you look at superachievers, there are always plenty of things they don't do well. What they have in common is finding what they do do well and making the most of it. I'm better verbally (I can write) than spatially (I can't get the suitcases to fit in the trunk of the car), so I have found a profession that enables me to capitalize on my verbal skills but makes no demands of my obviously inferior spatial skills. Pablo Picasso certainly found his strength, and Albert Einstein, his.

I, like they, had a chance. I will not reach their heights, but the opportunities were certainly there. As a child of middle-class America, I was given the opportunity to be more or less what I wanted to be, given what I could be. Do children of the ghetto have the same opportunity? If such children really had the potential to be great scientists, artists, musicians, or poets, how often would they even find it out? It's hard to become a great pianist if your parents can't pay for piano lessons, or a great scientist if you are not encouraged even to go to college. Are we really to believe that it is just IQ that holds people back from doing

what our society values, or should we not just as well believe that it is society that holds them back from accomplishing what they otherwise might have, had the circumstances of their birth and early years been more favorable?

The bottom line is that intelligence is not just some innate or even internal function of the individual. *Intelligence resides in the interaction between attributes of the individual and the nature of the environment in which the individual lives.* A person who is smart in one environment may be stupid in another. I have good reason to be glad I'm not living in a hunting culture, just as some excellent hunters may have good reason to be glad they are not here. Put me out on a raft to navigate by the stars, and you won't be seeing me again—I will have failed the ultimate intelligence test—the ability to adapt or die. If I were a good cab driver I could read a speech but not answer the simplest question. But I'll bet I could take you anywhere you wanted to go in the city I worked in.

IQ tests indeed measure one aspect of our cultural adaptations to the environment, but as the environment changes, what is adaptive may change as well. We have already seen such changes. Intelligence tests of roughly half a century ago, such as the Primary Mental Abilities tests of Louis and Thelma Thurstone, used to put considerable emphasis on numerical computation as an index of intelligence. Today, such abilities are rarely emphasized in intelligence testing. As calculators and computers play more and more important parts in the world, the emphasis on arithmetic computation is likely to continue to decline. It's not just arithmetic that has declined in importance. The person with the ability to produce extraordinary impressionist art or baroque music will receive nowhere near the rewards today that he or she would have received in the past. The modern artist displaying, say, a white square on another white square, would probably have been laughed out of town once, but today can exhibit in a prestigious museum. What is adaptive—and hence labeled as intelligence or some other ability—changes with time and place.

This is not to say that there are no constancies—there are, such as the ability to recognize when you have a problem or to identify what the problem is. But the assessment of intelligence is through cultural artifacts—in our case, IQ tests—and the value of IQ or any other set of abilities is likely to change with the cultural artifacts we value, unless we change the tests (such as by reducing the value of computa-

tion). At last, there is evidence that such change is starting to take place.

In education, there is increasing emphasis on performance testing (writing essays, doing projects—the kinds of tests already emphasized in many other countries) to the extent that it may eventually replace conventional assessment. Soon, it may be the good essay writer rather than the multiple-choice whiz whom we label as intelligent. However, many times people who excel in one assessment format will not do well in the other. So when such changes take place, what is viewed as an "improvement" in testing will really be merely the substitution of one set of cultural artifacts for another. We will change whom we value, but not the fact that culturally we value certain things over others and then label the people who do these things well as "intelligent."

If you have ever wished that you had been born in another time, you may have been right: In another time, you might truly have been more valued, as many deposed royalty have probably mused as they dreamed of the lost age of the divine right of kings. But what goes around comes around, as we have seen in so much of the world, and someday those who are deposed may find themselves back in business.

Are there Really Racial Differences in Intelligence?

One of the most controversial claims of the Herrnstein/Murray book is that there are race differences in intelligence. The fact is that we don't know if there are racial differences in intelligence, because we don't know fully how to measure in a reliable and valid way intelligence in all of its aspects, whether by my definition of intelligence or anyone else's.

IQ tests measure some (in my opinion, a small) part of intelligence in our culture, because we value the skills that such tests measure. There are racial differences in IQ, which Herrnstein and Murray document. Why are there such differences? We don't really know for sure. But that's boring.

Most scientists, when they don't know things for sure, are cautious. But sometimes we get our cold-fusion-type scientists who would rather go for the press coverage than the scientific confidence or respectability. Herrnstein and Murray decided to go the cold-fusion route, opting for the press coverage and to hell with so-called peer review. They threw caution to the wind and at the same time decided to give the appearance that they were being just as cautious as the data deserve. As I mention later, none of the studies the authors

cite really address the question of the cause of the difference in IQ between races, much as the authors like to claim to the contrary. And none of the studies even show racial differences in intelligence, more broadly defined.

I believe, along with anthropologist Shirley Brice Heath and many others, that different sociocultural and sometimes different ethnic groups emphasize different skills. For example, Lynn Okagaki and I found in a study of various ethnic groups in northern California that different groups valued different attributes as the more important parts of intelligence: The Anglo groups emphasized academic-competence skills, whereas some of the Latino groups emphasized social-competence skills. There is no "right" answer as to the nature of intelligence. Of course, IQ tests (in whose creation Latinos originally had no part) just happen to measure the former and not the latter, but that does not make the former more important to society or to the world. Arguably, social-competence skills are more important in many jobs than are academic-competence skills.

Meanwhile, mothers in the various groups studied were busy socializing their children to be "smart," but in the ways that they believed were appropriate in terms of their cultural heritage, ways that differed from one group to another. These differences are not limited to ethnic groups. In another study, I found differences in conceptions of intelligence even among members of different occupations, such as physicists, philosophers, and business persons. And so, predictably, the formal training and informal socialization in these and various other fields have different emphases. I can say for sure that some of the students who would be considered most "intelligent," say, in the theoretical-physics community, would not be considered so smart in the business community, and vice versa. Indeed, when magazines such as *Business Week* run their frequent surveys of what business leaders are looking for, a frequent comment of the leaders is that some of the graduates of business schools may be smart in an academic sense, but that these graduates don't have the practical smarts they need to succeed in business. *In the real world, when we talk about who's smart, we're not just talking about IQ, nor should we be.*

Herrnstein and Murray seem vastly to underestimate the socialization effects of schooling, home, and community. Why are there so many black basketball players but so many white tennis players? Check out the basketball courts and the tennis courts in

any city, and you'll see why. Indeed, Anders Ericsson, a psychologist at Florida State University, has looked at many kinds of expertise, and has found that the main variable differentiating the experts from the novices is not IQ at all, but rather, focused practice. Moreover, especially in the northern climates, country clubs with indoor winter courts have far fewer black members, so that the opportunities for winter practice aren't even there. We socialize children to be certain things and not others, and then are surprised that the socialization has worked. Of course, we have only partial control over this socialization, and sometimes, unfortunately, we see our goals for our children thwarted by the goals of peers or other adults. Perhaps the surprise is that we are surprised.

Measuring More than IQ

I have argued that the abilities needed for success are diverse, and that they are not captured by IQ tests. Let's get specific with some examples from my own three-part, or triarchic theory of intelligence, and then consider the data.

According to the triarchic theory, intelligence comprises three aspects: analytical, creative, and practical. Intelligence tests measure only the analytical aspect, and even then, only a small part of it. The creative and practical aspects are distinct, and different from the analytical one. Herrnstein and Murray emphasize the importance of IQ for success in the real world, so let's consider a very different take on real-world success. Try the following test item:

> You have been notified that because of a recently installed computerized accounting system, a new procedure for making weekly written reports has just been instituted for employees in your department. Neither you nor your employees have had input in the decision to change reporting procedures. The new reporting procedure will require somewhat more time and effort on the part of your employees, but your superiors and you yourself believe that the new procedure will benefit the company. You have called a meeting of your employees to inform them of the new procedure. Rank in order the quality of the following things you might do at such a meeting:
> a. Tell them you wish that you and they had been consulted about the new procedure first, but for now, everyone simply must accept the changes.
> b. Show, in as much detail as possible, how the new procedure will benefit the company.

c. Have the employees complete a sample report to show them that it is not very hard to do.

d. Give your employees the name and number of the director responsible for the new procedure, so that they may complain to that individual directly.

e. Promise to make their concerns known to your superiors, but only after they have made a good-faith effort by trying the new procedure for six weeks.

This item, presented in modified form, is from a test of practical intelligence for managers constructed by Richard K. Wagner of Florida State University and myself. We have constructed comparable tests for college teachers, sales people, and members of other occupations. In adulthood, practical intelligence is somewhat specific to a given domain, so different tests are used, but the principles underlying good performance and the testing itself are similar across domains. In the above example, experts ranked *b* highest, followed by *e*, then *c*, then *a*, and then *d*.

What do you find when you use this kind of test? In one study of 54 managers across the country, Wagner and I found a correlation of just .16 (on a -1 = perfect inverse relation, to 0 = no relation, to 1 = perfect positive relation) between scores on this test and a test of general ability. The correlation did not differ statistically from a correlation of 0, indicating no relation between scores on our test of practical intelligence and IQ. In another study with Air Force recruits, correlations with subtests of the Armed Services Vocational Aptitude Battery (ASVAB) averaged just .07, again not significantly different from 0. The correlation with race was .03 and with sex was .02, both trivial. So the test is not just another measure of IQ; nor does it show racial or gender differences.

Now consider correlations with various measures of success. In one study, the test correlated .34 with level of company (Fortune 500 or not) and .46 with salary across a variety of businesses and types of managerial jobs. In a study of bank executives, the test correlated .48 with merit salary increases, and .37 with performance ratings. In a study at the Center for Creative Leadership in Greensboro, North Carolina, a nationally known training center for executives, we found that scores on our test predicted performance on management tasks with a correlation of .61, better than that for IQ. Moreover, when IQ was held constant statistically (meaning that its effect was removed from the

correlation), the correlation was still .32.

Our ability to predict job performance is not limited to management. The version for sales people, developed in collaboration with Wagner and Carol Rashotte, correlated .31 with years in sales, .35 with yearly quality awards, and .37 with number of years of experience in the company being considered. Even in what would seem to be the most academic of jobs—that of a college professor—Wagner and I found correlations of .33 with number of publications and number of conferences attended, and .40 with rated prestige of the school in which the professor taught, and .39 with percentage of time spent in research. But the correlation with a measure of general ability was -.04.

Practical intelligence can be measured at all ages, not just in adults. For example, in a test I have used to select students for a high-school Advanced Placement psychology program taught at Yale and directed by myself and Pamela Clinkenbeard, we used a very different kind of test problem:

> Linda was awarded a scholarship for college that covers all of her expenses except books and supplies. She expects that she will need approximately $1000 per year. Being financially independent is of utmost importance to her. Which solution is most likely to give her the money she needs while she still remains financially independent?
>
> a. Use the money she hopes to receive from graduation gifts instead of spending it on new clothes for college.
>
> b. Tell her summer employer that she will work the extra hours he has offered to earn the money she will need.
>
> c. Take out a student loan.
>
> d. Borrow the money she needs from her parents.

The keyed answer was *b*, the option that best meets the constraints that Linda set for herself. We looked at who did well on this type of problem, as well as on practical mathematical problems (e.g., using train schedules, making computations with recipes, making computations involving purchase of tickets for athletic events) and for practical nonverbal problems (e.g., finding your way around a town, using a map). Again, we found that the high scorers were often not those who were particularly high in IQ. In our program, these students did very well, especially when the course was designed to emphasize practical use of the material being learned. Moreover, perhaps because we used practically-oriented as well as creatively-oriented problems, we had no trouble selecting

minority-group members for our program, without any special cutoffs or other standards.

My point here is quite simple: *First, IQ is not all that matters for intelligence. Second, other things that matter can be measured. Third, these other things can predict performance, at least in the circumstances we have assessed, at least as well as can IQ, and possibly better.*

I doubt that IQ tests, SATs, ACTs, GREs, and other rough equivalents are about to disappear. Nor are such tests utterly useless. They provide a limited measure of knowledge and analytical reasoning in the academic domain. But the problem has never really been as much with the tests as with the inflated claims made for them. Japan, with its emphasis on motivation rather than intelligence, and many other countries seem to have done fine without such tests. Many of these countries seem, more than our own, to have the right idea: to emphasize accomplishments—academic or otherwise—rather than what someone might accomplish. How strange that we have become a society that seems more to value what someone might do than what they actually do. A meritocracy is arguably a good thing. But it should be with respect to what people actually do, rather than what one test or another says they might (or might not) do. And society should give them the chance to do that which they are capable of doing. Walk into Harlem or inner-city Chicago, Detroit, or Los Angeles. If you can walk out and say with a straight face that our society is giving the kids in these environments equal chances, and that the problem with these kids is simply their low IQs, then you will love the Herrnstein/Murray book and how it tries to legitimize keeping the poor kids "in their place" via IQ testing.

Beyond Intelligence

Of course, you have probably noticed that there is more to success in life, however defined, than IQ, although it is not clear that Herrnstein and Murray have absorbed this message, even as it applies to themselves. For example, Marty Seligman has found that a key to success in many life endeavors is an attitude of optimism in the face of challenge and especially in the face of failure. How we handle our failures—whether we just give up or try to surmount obstacles—is often more important than whether we fail in the first place. Julian Rotter has found that another key is taking personal responsibility for your life, rather than pinning the blame for everything that does not work out on others or on the environment. In our own

work, we have shown, we believe, how much more important for success in life creativity is than merely analytical intelligence of the kind measured by conventional intelligence tests. Today, to succeed in almost any occupation and in other aspects of life, you need to go just a step beyond where others have gone before, and intelligence tests simply do not measure this creative attitude toward life. *My point, quite simply, is that motivation, personality, and even philosophy of life are all keys to various kinds of life success but are blown off by the authors with their vast arrays of statistics on IQ.*

Lies, Damn Lies, and Statistics

Actually, Mark Twain was wrong. Statistics don't lie; people do. Or at least, they sometimes distort the interpretations of statistics so that the unwary are fooled. Unfortunately, Herrnstein and Murray on more than one occasion engage in such distortion.

Correlation and Causation

Every student of elementary statistics quickly learns that correlation does not imply causation. In other words, the fact that one variable is related to another variable does not mean that the first variable causes the second variable. The second variable may cause the first, or both may be related to some third variable that causes both of them.

For example, suppose we compare Norwegians to Nigerians. There is here a strong correlation between being black and being Nigerian. But being black does not make you Nigerian, nor does being Nigerian make you black. A Norwegian who moves to Nigeria may take up Nigerian citizenship, but is unlikely to turn black. Rather, the correlation is based on a third, higher order variable, namely, where people of different skin colors in the past tended to settle. Correlation does not imply causation.

Now consider a typical Herrnstein/Murray example. In Chapter 7, the authors state that 10% of very bright individuals, 14% of bright individuals, 15% of normal individuals, 19% of "dull" individuals (their term), and 22% of "very dull" individuals spent a month or more out of the labor force in 1989. Here, as elsewhere, the authors are intent on convincing you that being dumb leads to bad news; in this case, being out of a job. But does low IQ actually *cause* unemployment? Carmi Schooler has shown that when people are not challenged intellectually through work, their intelligence suffers. So one might argue that being out of work can hurt IQ. But more plausibly, low scores on IQ

tests and being out of work could both be due to higher order causes, such as our society's failure to provide educational and job opportunities for many individuals, or lack of parental models that lead to the development of both school-related and job-related skills.

Indeed, some might find it rather appalling to read how, when unemployment goes down, many investment bankers get nervous that the economy will overheat, or that inflation will soon rise. The investment community then urges the Fed to put on the brakes to make sure that unemployment does not go down too much. This kind of logic may or may not help the economy; what is for sure is that it results in society's turning its back on the same individuals as adults who were passed over as children.

Although Herrnstein and Murray know that you cannot infer causality from correlation, they often act as though you can. All of the data in their book are correlational. They show that there is a statistical association—virtually always weak, although they generally do not point this fact out—between IQ and various aspects of their interpretation of life success (e.g., higher occupational or economic status). But they would like you to believe that the differences in IQ scores are responsible for, not merely correlates of, differences in the various measures they consider. Indeed, their book would not have received anywhere near the attention it has were the authors simply pointing out—quite correctly—that IQ, like numerous other variables, is weakly correlated with various life outcomes. Good science so rarely makes racy headlines.

Comparing Correlations

Throughout their book, Herrnstein and Murray compare the correlation of IQ versus other variables, such as economic status or education, with various measures of success. They show various line graphs where IQ seems to have a more powerful effect than do other variables, and then conclude that IQ is the winner—the king of predictors. Are they right?

The problem is that their comparisons of predictors are often like comparisons of apples and oranges. The correlation of one variable with another depends on many factors, only one of which is the true relation between variables. One factor is the range of values of the variable (large ranges tend to produce higher correlations); another is the reliability or consistency with which the variable can be measured (higher reliabilities tend to produce higher correlations); and most importantly for our purpos-

es here, a third factor is the extent to which the variable actually measures the construct.

IQ scores may measure a narrow range of intellectual functioning, but what they measure, they measure well. For example, you could probably get a pretty good indication of a person's vocabulary or reading level from a typical IQ test, such as the Stanford-Binet. The abilities interacting with opportunities that lead one to develop higher test scores also are likely to lead to higher vocabulary. But now consider what "years of education" measures, or "family income." Is number of years of education a good measure of vocabulary or reading level? Not in our country: You can graduate from high school and be illiterate. How about family income? A child may be from a family of millionaires and yet be spending all of his or her time with child-care workers who neither read nor even speak English and hence are not providing socialization in it.

None of these variables—IQ, years of education, family income, or any of the others that Herrnstein and Murray consider—are the true causes of individual differences in various kinds of success or failure. Rather, they are all proxies for other things. The problem is that IQ is a closer proxy for what it measures than are the other variables for what they measure. Hence, IQ comes out looking better than these other variables in the various comparisons Herrnstein and Murray do. *It is not that IQ is such a great predictor*—the correlations (usually not given in the book) are actually quite modest with the various forms of success of which the authors speak. Rather, *it is that the other variables are so bad* because there is so much variability in what things like years of education or family income really mean for future success.

The implication here is not that IQ is such a great predictor—it's not—but that we need more refined measures of educational impact, family impact, and the like. Number of years of education is an inadequate measure of the beneficial effect of education on the child and his or her future. Was the schooling in an academic or vocational track? Was it in a wealthy suburban school district with vast economic and other resources, or in a poor inner-city ghetto with few resources? If family income was low, was it because parents were unwilling to work, were unable to work, or what? Herrnstein and Murray do their comparisons in a way that makes IQ look more powerful, and other variables less powerful, than they probably are in truth.

Heritability and Group Differences in Intelligence

Herrnstein and Murray also know that you cannot draw conclusions about the origins of differences between groups on the basis of the heritability of an attribute within groups, as it is customarily computed. Consider their own example. You take some seeds—say, of corn—and plant a random half of the seeds in the fertile fields of Iowa, and the other half of the seeds in the Mojave desert. Whatever attributes make for tasty corn may well be highly heritable, and yet the corn planted in the Mojave desert will probably not only be lacking in taste, it is likely to be lacking in viability as well. Within-group heritability (in Iowa or in the desert) does not tell you anything about the between-group difference in viability.

Again, though, despite their knowledge of this basic principle, Herrnstein and Murray give us a full set of heritability statistics computed from twin studies (within-groups) in order to lead us to believe that we can thereby infer something about the origins of differences between racial and ethnic groups. We can't. And if you spend enough time in a burnt-out ghetto, you will understand that as well as the farmer who spends some time in the Mojave desert.

So what does it mean that, as Herrnstein and Murray report in Chapter 4, the genetic component of IQ is unlikely to be smaller than 40 percent or higher than 80 percent? Not much. This figure applies only to IQ, not to intelligence as a whole. It tells us about variation across individuals within, not between racial, ethnic, or other groups. It applies only under the environmental circumstances currently available. It inadequately takes into account how genes and environment interact. And it makes a set of statistical assumptions that many people in the field question. The data here are correct. What is not correct here as elsewhere is the interpretation that Herrnstein and Murray give to those data.

Heritability and Secular Increases in Intelligence

Herrnstein and Murray further know that even if intelligence does have some degree of heritability—it most likely does—such data do not imply that intelligence cannot be increased. Indeed, they themselves show that crime has increased drastically in recent years, despite their claim that criminality is partially heritable. *If they applied the same argument to intelligence that they do to crime, they would have to conclude that intelligence, like crime, can increase over time, despite its partial heritability.* But as elsewhere,

the authors seem to make only the arguments that suit their socio-political ideology.

The book takes an even more blatantly ideological stance when the authors attempt simultaneously to argue that IQs have been going up (the so-called Flynn effect) and that they have been going down due to what they might look at as the overbreeding of inferior stock. In Chapter 15, Herrnstein and Murray have to go through all kinds of intellectual gyrations in order to explain how IQ could be going up as much as 1 point per year in some years and some countries (Chapter 13), and down 0.8 point per generation (Chapter 15) simultaneously. The authors end up arguing that, well, maybe IQ is not such a great measure of intelligence after all (that after equating IQ with intelligence throughout the rest of the book). For example, they argue that maybe IQs have been going up because people have become better test-takers. But they do not make the obvious conceptual leap to the rest of the book: Maybe many of the differences in IQ they are talking about reflect in large part differences in ability to take tests, or attitudes toward the tests. They dismiss the importance of differences in test-taking ability and attitude where it suits them (e.g., differences between whites and blacks) and then resurrect it where it suits them (e.g., rising IQ scores). You can't have it both ways.

Actually, intelligence could be both partially heritable and subject to changes over time, in either an upward or downward direction, although the best indications are that the direction has been up. The most obvious and common analogy is to height, which is very highly heritable. Despite this heritability, heights have increased over the years, especially in Japan. The fact of heritability says nothing about mean differences between groups over time and place, a fact of which the authors are aware. Indeed, phenylketonuria is a disease that is perfectly heritable, and yet an environmental intervention—withholding of just one amino acid from the diet—can counteract its vicious effects. Here as elsewhere, we need to realize that heritability does not imply that environmental interventions cannot have major effects.

Herrnstein and Murray argue that attempts to increase intelligence have been less than successful. Their claim is ironic, because Herrnstein was the head of a team that produced one of the most successful programs ever in increasing intellectual abilities (a project in Venezuela that is actually cited in the book). But whereas the *American*

Psychologist report for psychologists emphasized the success of this program, *The Bell Curve* report for laypeople emphasizes its failure. Again, the authors try to have it both ways, in this case, letting ideology dictate the interpretation of results.

I agree with the authors and with others, such as Arthur Jensen, that our success in increasing abilities has not been what we had hoped for. But consider the history of such attempts. Theory-based attempts to raise intelligence go back only to the early part of the twentieth century, when Binet proposed his mental orthopedics. In contrast, theory-based attempts to improve health go back much further, arguably, with regressions in-between, to ancient times. Our attempts to understand and improve intelligence are far too recent for us to draw any conclusions as to what their ultimate effectiveness will be.

What Happened to the Bell Curve?

The title of this book is *The Bell Curve,* and a picture of this curve is featured prominently on the cover. Indeed, the curve looks like a bell, with most scores on bell-shaped distributions in the middle and the remaining scores in rapid diminution toward the extremes. Throughout the book, however, Herrnstein and Murray continually refer to "the emergence of a cognitive elite," and contrast this elite with what comes off as the intellectual dregs at the low end of the scale. For most of the book, Herrnstein and Murray seem to forget that IQ, like many other variables, occurs on a roughly continuous distribution, and that extreme scores at either end of the distribution are rare. It is not clear why we should get the kind of extreme class differentiation and polarization of which Herrnstein and Murray repeatedly warn us, given their own acknowledgment that IQ is distributed continuously, not into two extreme groups.

Ideological Blindness and Social Policy

Can you imagine a social policy based on just a single attribute of people, whatever that attribute happened to be? The final chapters of this book suggest one anti-Utopian vision of what such a social policy might be if it were based solely on IQ. Whether or not you are a fan of IQ, you may well hope, as do I, that government officials never decide to make social policies on the basis of a single attribute, whatever that attribute may be. And if it were to be IQ, perhaps it would be time to move.

In fact, intelligence has always been one factor affecting social policy, but as often as not,

it has gone in the way exactly opposite to that proposed by Herrnstein and Murray. Many totalitarian societies have targeted the intelligentsia as the first group to go, whether it is to prison camps or to death squads. Indeed, tracts arguing against the danger of self-appointed intellectuals have a far longer history than tracts, such as this one, arguing against the danger of those with lower IQ. A television miniseries philosophically modeled on real-life totalitarian takeovers, "V," was based around the idea of aliens first targeting scientists for extermination because of the danger of their pointing out the true, sinister purpose of the alien invasion (in this case, to steal the Earth's water and use the people for food). The content was science fiction but the message was not: Societies target the groups that do not fit their goals, whatever the goals happen to be.

The identities of the scapegoats change, but the human search for scapegoats lives on. Sometimes the scapegoats have certain skin colors; other times, certain religions; now they have certain test scores. Always, there are those who have written glib and superficial essays on why the targeted group needs special attention, whether via extermination or via paternalistic social policies designed to protect the poor suckers from themselves (and, not coincidentally, to protect the privileged from those who would seek to strip them of their privileges).

Herrnstein and Murray even do what the bigots of old have always done (which is not to say these authors are bigots, but merely to point out that they use the same techniques): They throw a special sop to their readers. They note that you, the reader of their book, are not the problem. Indeed, if you are reading their book, they tell you, chances are that you are a privileged member of the cognitive elite. (Yup, pay your $30 and you too can be among the cognitive elite.) It is always "the other ones" who are causing the problem, the ones who are not living right near you but sure as hell are trying to, the ones who threaten to invade your community and your private sense of well-being.

You start off talking about the inferiority of the targeted group, perhaps describing them as unlucky but nevertheless unworthy of the opportunities that should be open to others. Eventually, somewhere along the line, you tip your hat, as do Herrnstein and Murray by the end of Chapter 16, where they speak of the inequality we will have to face in the twenty-first century. Inequality of what? Scores on IQ tests? Almost 400

pages into this mind-numbing book, what would have seemed like a big step at first—to speak of low-IQ individuals as "unequal"—no longer seems like such a big step to the authors, and perhaps to many readers. Our society, founded on the basis of equality, now becomes one where, at its Orwellian best, some are more equal than others. How well these lines remind me of the off-handed comment of a college roommate, made during a discussion of the Nazi atrocities of World War II, that he was glad he wasn't Jewish, just in case history repeated itself.

Lucky guy: The recent targets have been Bosnian Muslims and Rwandan Tutsis. But who knows who will be targeted next? People with low IQs? But remember—you don't have to worry if you read Herrnstein and Murray's book. How glad I am they didn't pick on me. I hate it when they go after Jews, brown-eyed people, or even, as in the Berkeley campus of yore, "people over 30." Blue-eyed people? The hell with them, I say. Let 'em fend for themselves.

I feel sorry that the main message of this book is so intellectually corrupt as well as corrupting, because there are important points in the book that truly are worth the discussion that Herrnstein and Murray say they want.

One such point is the undervaluing by our society of our intellectually gifted. They receive only the most minimal resources (the authors cite a figure of .1%) in comparison with other special-needs groups, despite the fact that they truly are important to our nation's future.

A second such point is the dumbing down of textbooks in our country, a phenomenon that has been documented statistically by Sally Reis of the University of Connecticut. Over the years, what counts as a sixth-grade textbook, for example, or a college textbook, for that matter, has been degraded. Books at a given grade level are getting easier and easier as students become less and less verbally skilled. The solution is not to dumb-down the textbooks, but to raise our standards of education.

A third such point is the policy of affirmative action, which often has not worked out the way it was supposed to. The racial divisions in campus life that Herrnstein and Murray point out are real, whether or not the reasons are the ones that the authors cite. We do need to rethink these policies and whether they are accomplishing what they were intended to accomplish—a truly integrated and more harmonious society. But the good points are lost among the bad, much as seeds would get lost in a heap of

manure. And a heap is what we have here. Murray's reference to the book in *The New York Times Magazine* as "social-science pornography" was on target. By the time you have finished reading about how, for poor single women considering having a baby, moral considerations no longer carry any weight, or about how attractive the welfare package is for this woman as she considers having a child (Chapter 8), you will have burned into your mind that vivid image of the welfare queen sucking the lifeblood out of society. By the time you are finished reading about the percentage of criminals who are after your money and your life who are intellectual dullards (Chapter 11), you too may be ready to confine those dullards to an institution with bars before they get to you first. *It would be hard to find a vicious prejudice in our society that has not made its way into this book, which is why the authors did, and so many readers will, feel comfortable with the fact that the book is just saying what they preconsciously "knew" all along.* How unaware we are of our own prejudices, and yet how comfortable we are with them!

Santayana was right: Those who don't learn from history are doomed to repeat it. And in our society's fascination with the Herrnstein and Murray book, we are reliving the past. Who cares about the countless scientific studies that are thoughtful, balanced, and hence, unnewsworthy? As a society, we are fascinated by the outrageous and the bizarre. There has become no better way to make your name than to do the outrageous, and then let your publicists and the media pave your way to fame and fortune. Don't blame the media: They are simply reflecting the values of the society as a whole.

Is it really Herrnstein and Murray's IQs we value, or their outrageousness? If our society is going to hell in a handbasket, is it really because our intelligence is declining (it's not), or because our sense of values has become so malicious and so perverse? Indeed, do we now have to pass laws preventing criminals from profiting from their crimes, not through what they took illegally, but from what they will take legally when they write their books? If you want to understand what is wrong with our society, pay attention not to IQ, but to the attention this book on IQ is receiving. Then you will understand, and you will be rightfully sad. *The Bell Curve* tolls, and it tolls for you.

Now—are there any simple questions even a cab driver could answer?